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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,902	01/14/2004	John P. Taylor	UTL 00380	1280
7590 05/23/2005			EXAMINER	
Kyocera Wireless Corp. P. O. Box 928289 San Diego, CA 92129-8289			NGUYEN, HOAI AN D	
			ART UNIT	PAPER NUMBER
			2858	
DATE MAILED: 05/23/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

4.7

<b>Office Action Summary</b>	<b>Application No.</b> 10/757,902	<b>Applicant(s)</b> TAYLOR, JOHN P.	
	<b>Examiner</b> Hoai-An D. Nguyen	<b>Art Unit</b> 2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 May 2005.  
2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.  
4a) Of the above claim(s) 15-20 is/are withdrawn from consideration.  
5) ☒ Claim(s) 8, 10-12 and 14 is/are allowed.  
6) ☒ Claim(s) 1, 2, 4-7, 21, 22 and 24-27 is/are rejected.  
7) ☒ Claim(s) 3, 9, 13 and 23 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 14 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>09/20/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group I, claims 1-14 and 21-27, in the reply filed on May 6<sup>th</sup>, 2005 is acknowledged.
2. Claims 15-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group II, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on May 6<sup>th</sup>, 2005.

### *Drawings*

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the subject matter of claims 2, 9 and 22 (bipolar junction transistor-based operational amplifier) and the subject matter of claims 6, 13 and 26 (field effect transistor) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

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drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4, 5 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Li (US 5689162 A).

Li teaches an apparatus and method for current sensing for motor driver in pwm mode comprising:

With regard to claim 1, a circuit (FIG. 1, feedback circuit 24) for sensing current through a resistive element (FIG. 1, sense resistor (R Sense) 22), the circuit comprising: a sampling unit (FIG. 1, sample and hold circuit 30) switchably coupled to the resistive element (FIG. 1, sense resistor (R Sense) 22), the sampling unit configured to sample a voltage across the resistive element during a sampling mode; and a charge transfer unit (FIG. 1, sample/hold switch 31) switchably coupling an amplifier (FIG. 1, feedback or sense amplifier 26) to the sampling unit

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(FIG. 1, sample and hold circuit 30), the charge transfer unit and the amplifier operable to convert the voltage to a ground-referenced output voltage during a charge transfer mode (From column 3, line 57 to column 4, line 30).

With regard to claim 4, the sampling unit comprises a capacitor (FIG. 2, capacitor 32).

With regard to claim 5, the resistive element comprises a resistor (FIG. 1, sense resistor 22) having a first end coupled to a battery (FIG. 1, DC supply 17) and a second end coupled to one of a charging unit and a device system (FIG. 1, storage device 32).

With regard to claim 7, first and second resistors, the first resistor (FIG. 2, resistor  $R_2$ ) coupled across a negative-feedback loop of the amplifier (FIG. 1, feedback or sense amplifier 26), the second resistor (FIG. 2, resistor  $R_1$ ) coupled between a first end of the first resistor and ground.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Ichihara (US 5,331,230 A).

Li teaches all that is claimed as discussed in the above rejection of claims 1, 4, 5 and 7, but he does not specifically teach the followings:

- The amplifier comprises a bipolar junction transistor-based operational amplifier.

- A field effect transistor having a first end coupled to a battery and a second end coupled to one of a charging unit and a device system.

However, Ichihara teaches an integrated-circuit sampled-and-hold phase detector with integrated current setting resistor comprising:

With regard to claim 2, the amplifier comprises a bipolar junction transistor-based operational amplifier (FIG. 3, transistor 20, analog switch 22, circuit junction 41, storage capacitor 24, sampling switch 23, sampling capacitor 25, buffer amplifier 26 and integrator 27).

With regard to claim 6, a field effect transistor (FIG. 3, transistor 20) having a first end coupled to a battery (FIG. 3, voltage supply  $V_{CC}$ ) and a second end coupled to one of a charging unit and a device system (FIG. 3, storage capacitor 24 and sampling capacitor 25) (Column 3, lines 47-58).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus and method for current sensing of Li to incorporate the teaching of using bipolar junction transistor-based operational amplifier and determining the current through a field effect transistor taught by Ichihara since Ichihara teaches that such an arrangement is beneficial to provide a differential integrator for providing differential integration on the voltage sampled by the sample-and-hold circuit and controlling the current setting circuit with the differentially integrated voltage in a feedback loop as disclosed in the abstract.

5. Claims 21, 24, 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Li.

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With regard to claim 21, Applicant admitted on page 6, lines 9-13 in the specifications that a typical mobile communication device comprising:

- A transceiver for transmitting and receiving an RF signal;
- A mobile power source coupled to the transceiver for supplying power to the transceiver; and
- A resistive element coupled in series between the mobile communication device and one of the mobile power source and ground.

However, the prior art does not specifically teach a circuit for sensing current through a resistive element, the circuit comprising: a sampling unit switchably coupled to the resistive element, the sampling unit configured to sample a voltage across the resistive element during a sampling mode; and a charge transfer unit switchably coupling an amplifier to the sampling unit, the charge transfer unit and the amplifier operable to convert the voltage to a ground-referenced output voltage during a charge transfer mode.

To fulfill this need, as discussed in the above rejection of claim 1, Li teaches all that is claimed, including a circuit (FIG. 1, feedback circuit 24) for sensing current through a resistive element, which is coupled in series between the PWM drive system and one of the power source and ground.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the typical mobile communication device of prior art to incorporate the teaching of a circuit for sensing current through a resistive element taught by Li since Li teaches that such an arrangement is beneficial to provide a reliable current sensing

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circuit for devices in which accurately sensed current is important for control and monitoring purposes as disclosed from column 2, line 29 to column 3, line 6.

With regard to claim 24, Li teaches the sampling unit comprises a capacitor (FIG. 2, capacitor 32).

With regard to claim 25, Li teaches the resistive element comprises a resistor (FIG. 1, sense resistor 22) having a first end coupled to a battery (FIG. 1, DC supply 17) and a second end coupled to one of a charging unit and a device system (FIG. 1, storage device 32).

With regard to claim 27, Li teaches first and second resistors, the first resistor (FIG. 2, resistor  $R_2$ ) coupled across a negative-feedback loop of the amplifier (FIG. 1, feedback or sense amplifier 26), the second resistor (FIG. 2, resistor  $R_1$ ) coupled between a first end of the first resistor and ground.

6. Claims 22 and 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Li as applied to claim 21 above, and further in view of Ichihara.

Prior art and Li teach all that is claimed as discussed in the above rejection of claims 21, 24, 25 and 27, but they do not specifically teach the following:

- A field effect transistor having a first end coupled to a battery and a second end coupled to one of a charging unit and a device system.

However, Ichihara teaches an integrated-circuit sampled-and-hold phase detector with integrated current setting resistor comprising:



With regard to claim 22, the amplifier comprises a bipolar junction transistor-based operational amplifier (FIG. 3, transistor 20, analog switch 22, circuit junction 41, storage capacitor 24, sampling switch 23, sampling capacitor 25, buffer amplifier 26 and integrator 27).

With regard to claim 26, a field effect transistor (FIG. 3, transistor 20) having a first end coupled to a battery (FIG. 3, voltage supply  $V_{CC}$ ) and a second end coupled to one of a charging unit and a device system (FIG. 3, storage capacitor 24 and sampling capacitor 25) (Column 3, lines 47-58).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the typical mobile communication device of prior art to incorporate the teaching of using bipolar junction transistor-based operational amplifier and determining the current through a field effect transistor taught by Ichihara since Ichihara teaches that such an arrangement is beneficial to provide a differential integrator for providing differential integration on the voltage sampled by the sample-and-hold circuit and controlling the current setting circuit with the differentially integrated voltage in a feedback loop as disclosed in the abstract.

#### *Allowable Subject Matter*

7. Claims 3 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

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- The primary reason for the indication of the allowability of claims 3 and 23 is the inclusion therein, in combination as currently claimed, of the limitation of the charge transfer unit comprising first, second, third and fourth switches, the first switch coupling a first terminal of the sampling unit to an input of the amplifier and the second switch coupling a second terminal of the sampling unit to ground during a first charge transfer mode, the third switch coupling the second terminal of the sampling unit to the input of the amplifier and the fourth switch coupling the first terminal of the sampling unit to ground during a second charge transfer mode. This limitation is found in claims 3 and 23 is neither disclosed nor taught by the prior art of record, alone or in combination.

8. Claims 8, 10-12 and 14 are allowed.

The following is an examiner's statement of reasons for allowance:

- The primary reason for the indication of the allowability of claim 8 is the inclusion therein, in combination as currently claimed, of the limitation of a charge transfer unit switchably coupling a first input of an amplifier to the sampling unit, the first input switchably coupled to a first terminal of the sampling unit when the current flows through the resistive element in a first direction, the first input switchably coupled to a second terminal of the sampling unit when the current flows through the resistive element in a second direction opposite the first direction. This limitation is found in claim 8 is neither disclosed nor taught by the prior art of record, alone or in combination.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

9. Claims 9 and 13 are objected and would be allowable if rewritten or amended to overcome the objections, set forth in the Drawings section of this Office action.

### *Conclusion*

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant's attention is invited to the followings whose inventions disclose similar devices.

- Hentschel (US 3,996,480 A) teaches a sample and hold-circuit arrangement for an electrical motor simulator of an electronic motor protection relay.
- Schaffer (US 5,498,984 A) teaches a high side, current sense amplifier using a symmetric amplifier.
- Curtiss (US 6,172,481 B1) teaches a method and apparatus for rapid charging batteries under sub-optimal interconnect conditions.
- Salina et al. (US 6,184,665 B1) teach an integrated current mode PWM drive system supply voltage scaleable while retaining a high precision.
- Sanders et al. (US 6,497,135 B1) teach a controller for use with wide range oxygen sensor.
- Cooper (US 6,577,139 B2) teaches an impedance converter circuit.

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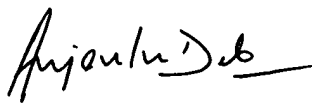
- Hunter et al. (US 6,577,302 B2) teach a display device having current-addressed pixels.
- Jones et al. (US 6,621,259 B2) teach a current sense amplifier and method.
- Chen (US 6,867,595 B2) teaches a Verification system for verifying authenticity of a battery and method thereof.
- Higashi et al. (US 2004/0130356 A1) teach a sampling/holding method and circuit.

### CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoai-An D. Nguyen whose telephone number is 571-272-2170. The examiner can normally be reached on M-F (8:00 - 5:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lefkowitz can be reached on 571-272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**ANJAN DEB**  
**PRIMARY EXAMINER**

HADN

Hoai-An D. Nguyen  
Examiner  
Art Unit 2858  
*HADN*